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Substitute Specification showing changes

~~DEVICE FOR STORING AND TRANSPORTING~~UNIT LOADS AND INSERT FOR SAME

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Background of the Invention

The present invention relates to a device for storing and transporting discrete articles, and to an insert for a device of this kind.

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A very wide range of demands are made of transport and storage systems of this kind in practice, depending on the type of discrete article. Robust discrete articles can be stacked in crates, cartons or in the loading areas of trucks, or piled on top of one another. However, the transport and storage of delicate discrete articles are substantially more complicated. In industry, a large range of finished products and semi-finished products are manufactured which then have to undergo transportation to another site or intermediate storage.

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In this connection, certain individual parts in the manufacture of motor vehicles come to mind, for example. Thus, gear parts are often made at a considerable distance from the factory in which the gear is mounted and/or assembled. Body parts too, such as the doors of a passenger vehicle, are typically not made in the immediate vicinity of the production line where they are mounted on the corresponding vehicle. Other examples of such discrete articles are washers, bearing shells and many other parts with delicate surfaces, which would be scratched or damaged in some other way if the articles were stacked or piled on top of one another haphazardly. Originally, discrete articles that were sensitive to impact and contact were packaged for transport over relatively long distances and for storage, usually at great expense. For this purpose, transport crates or cartons were provided with a specially shaped insert, generally made from polystyrene, which was adapted to the shape of the discrete article and which held the delicate parts or surfaces thereof at a safe distance from other articles.

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However, this is a relatively costly and complicated procedure. The space needed during transport is a multiple of the total volume of the transported discrete articles, because the packaging of the discrete articles is very bulky. Moreover, when the discrete articles were unloaded and unpacked, the packaging was frequently damaged and was not then suitable for re-use. Even if it was not damaged, however, the empty packaging had to be transported back to the point of origin of the discrete articles in a further journey, which is little different from a

truck or railway car making a journey empty. Finally, the packaging procedure and indeed unpacking of the articles are relatively time-consuming, labor-intensive and correspondingly costly.

5 For this reason, DE 41 38 507 has already proposed a transport and/or storage device for discrete articles, having a web of foil or woven material which can be folded up and which, when it is folded up, forms at least one substantially U-shaped bag in which the discrete article can be received, a suspension device being provided at the upper end of the bag, capable of being suspended on at least one suspension device which is secured to a base  
10 structure.

In use, the discrete article is simply inserted into the U-shaped bag which is formed by the foil or woven web, and this bag is then in turn suspended at the upper ends of the limbs of the U. In this arrangement, the foil or woven web lies around the discrete article and abuts against it  
15 such that the suspended bag does not occupy substantially more space than the inserted discrete article itself. Depending on the type of material of the discrete articles to be transported, the foil or woven webs could where appropriate be padded or upholstered.

So that the articles transported in these devices are treated gently, the material webs are  
20 usually made from a relatively soft, flexible cloth, which may for example be a fabric or may indeed be made from a fleece-like material or where appropriate a synthetic web or a foil with embossed elements.

If the articles concerned are relatively large and comparatively thin, the U-shaped bags into  
25 which the articles are pushed either from above between two rods or, indeed, from the side into the ends, open at the sides, of the U-shaped bags have to have a correspondingly large vertical (and where appropriate also horizontal) depth. In that case, a relatively long piece of material web hangs down loosely, forming a U-shaped loop, between two adjacent rods from which the two ends of a U-shaped bag of this kind are suspended.

30 Because this material web is relatively soft and flexible in order to treat the articles to be transported and/or stored gently and to protect them, when the material webs hang down loosely the opposing web portions can be distorted relatively easily or indeed form folds, which can result in the two portions of a U-shaped bag which form the limbs of the U lying

against one another, so that the bag concerned is no longer open and readily accessible, at least on one of its end sides or some of these end sides. This means that it becomes considerably more difficult to load a device of this kind, because someone who wants to push an article into this bag has first to open the bag, that is to say to separate the portions of the material webs lying against one another, in order to be able to push an article into this bag. This is particularly irksome if that person already needs both hands to carry the article and insert it into the bag, which can then result in the article first having to be put down and then the bag concerned having to be opened, with the result that the article can only thereafter be picked up again and pushed into the bag, it also being possible for the bag to close again automatically if it is not deliberately held open.

For this reason, DE 198 26 429 has already proposed a device in which the U-shaped bags are each formed by two separate and substantially parallel material webs made from the flexible material, in which case at least one connection web in each case, made from the flexible web material, extends between the two material webs and is preferably connected to both adjacent material webs over substantially its entire length.

However, all the known devices have in common the fact that during use, in particular during the transport and storage of relatively heavy discrete articles with relatively sharp edges, damage to the bag at least in the region of the bag which takes up substantially the main load of the discrete article frequently occurs. The accordingly damaged bag of the device cannot then continue to be used, with the result that the device can only receive a relatively small number of discrete articles while occupying the same space, which results in a higher space requirement per discrete article and hence in higher transport and storage costs.

Moreover, with the known devices, on repeated use of the devices soiling of the bags frequently occurred, which in turn may damage the discrete articles received therein. However, appropriate cleaning of the bags is very costly.

#### Brief Summary of the Invention

In accordance with the invention, at least one insert (6) is provided for insertion into a bag (3) for receiving a discrete article, said insert (6) being preferably located in a portion of the bag taking up substantially the main load of the discrete article and being moveable relative to the bag, securable to the bag and removable from the bag.

The invention also includes a device for storing and transporting discrete articles, having at least one bag (3) in which the discrete article can be received, wherein it comprises at least one insert (6), as described above, in the region of the bag (3) taking up substantially the main load of the discrete article, said insert being movable relative to the bag and detachably secured to the bag (3).

#### Brief Description of the Several Views of the Drawings

Figure 1 shows a device for storing and/or transporting discrete articles,

Figure 2 shows three different embodiments of the device from Figure 1, with inserts according to the invention,

Figure 3 shows an example of a securing procedure for an insert according to the invention, and

Figures 4 to 8 show different embodiments of the insert according to the invention.

#### Detailed Description of the Invention

By comparison with ~~this~~ the above described prior art, the object of the present invention is therefore to provide a device for storing and/or transporting discrete articles, having at least one bag in which the discrete article can be received, which is simple in construction and in which the loading and unloading procedure is simplified, that is to say that the risk of individual web portions forming the bag being distorted is virtually ruled out, in which the risk of damage to the bags is in particular markedly reduced, and which is easy to clean.

In accordance with the invention, this object is achieved by a device of the type mentioned, in which at least one insert is provided preferably in the region of the bag taking up substantially the main load of the discrete article and is movable relative thereto or is secured to the bag but is removable therefrom.

As a result of this measure, two disadvantages of the devices of the prior art are obviated at the same time. On the one hand the insert, which is secured to the bag, results in the bag being stiffened, so that the risk of distortion of folding of the material web is virtually ruled out. The insert thus ensures that the bag is always open and readily accessible at its end side. For this reason, the bags can easily be loaded and unloaded by just one person.

On the other hand, the insert provides protection against damage and/or soiling to the bag. Although damage may still occur in the case of heavy, sharp-edged discrete articles, this damage no longer affects the bag but only the insert. The insert can either be removed from the bag or moved relative thereto, in accordance with the invention, if it is damaged or soiled,  
5 so that another, undamaged portion of the insert is now arranged in the region of the bag taking up the main load of the discrete article. It will be understood that the region which takes up substantially the main load of the discrete article does not by any means always have to be arranged at the base of a bag. Thus, for example, it is also conceivable to equip the side walls of the bags with the inserts according to the invention, in particular if discrete articles  
10 which have sharp-edged projections on their sides that press into the side wall of the bag, creating a high local pressure, are to be received.

As a result of the insert according to the invention, it is also possible to simplify cleaning. Because most of the soiling conventionally occurs in the region of the bag that takes up the  
15 main load of the discrete article, soiling will substantially affect the insert, with the result that the latter can either be removed from the bag and then replaced, or be cleaned and put back in again, or can be displaced relative to the bag, so that after the displacement another, unsoiled region of the insert is arranged in the region of the bag which takes up substantially the main load of the discrete article.

20 Advantageously, the insert is detachably secured to the bag such that it is possible to remove the insert from the bag in a simple manner, without additional tools.

The insert may for example be secured to the bag with the aid of double-sided adhesive tape.  
25 Alternatively, or in combination therewith, the insert may be securable to the bag with the aid of a Velcro or hook-and-burr closure or a similar closing system. In both cases, a simple and speedy removal or replacement of the insert is ensured.

In a preferred embodiment, the inserts are secured to the bag such that they can be removed  
30 therefrom without damage to the bag.

In a particularly preferred embodiment, a plurality of inserts are provided. In particular if the region of the bag that takes up the main load of the discrete article is relatively large or varies in its position as a function of the discrete article that is to be stored or transported in the bag,

these measures can further lower the costs which are associated with replacing the insert, since in that case only the damaged or soiled insert has to be replaced or cleaned.

5 In a further particularly preferred embodiment, a plurality of inserts are provided one above the other, in which case preferably the insert lowest down is secured to the bag, while the other inserts are each detachably secured to the insert below them. This has the advantage that no reserve inserts have to be provided. It is thus possible for the person who is responsible for loading or unloading the device with discrete articles to notice, for example during the loading procedure, that the insert is damaged or soiled and simply to remove the top insert from the  
10 bag. As a result of this, the next insert, which is not soiled or damaged, is revealed and the loading procedure can be continued without any delay. Ideally, a check should then be carried out at regular intervals to ensure that sufficient inserts are available, one above the other, in the bag, and where necessary the number of inserts lying above one another increased.

15 In a further particularly preferred embodiment, the at least one insert is displaceable relative to the region of the bag which takes up substantially the main load of the discrete article. This measure also brings about a whole series of advantages. Because, conventionally, the device for storing and/or transporting discrete articles is not always loaded with the same type of discrete articles, it may occur that the region of the bag which takes up the main load of the  
20 discrete article is rather towards the front region of the bag with one type of discrete article, whereas this region is rather towards the rear part of the bag with another type of discrete article. If the insert is displaceable relative to the bag, the insert can be displaced to the area where the region of the bag which takes up the main load of the discrete article is to be found, for the type of discrete article used. If, over time, the insert is damaged or soiled, then in  
25 general the whole region of the insert is not affected. It is thus possible to displace the insert such that now another part of the insert takes up the main load of the discrete article, so that the insert can be used for longer before replacement or repair is necessary.

In a particularly advantageous embodiment, the insert takes the form of a strip. This strip can  
30 where necessary be of considerable length. For example, it is possible for the insert to be pushed on a little after each use and the soiled and/or damaged strip to be taken up in a corresponding take-up device, for example a winding-up device. Particularly preferably, the insert takes the form of an endless strip which is looped around the base region of the bag. Here too, the endless strip can be pushed on appropriately after every use which causes

damage and/or soiling to the insert. Only once the strip has been soiled and/or damaged almost everywhere does it have to be replaced.

In a further particularly advantageous embodiment, a brush device is provided for cleaning the at least one insert. In this case, the at least one insert preferably engages with the brush device and is movable relative thereto. If the insert is now moved relative to the brush device, the brush device cleans the insert automatically, with the result that the latter can be used over a relatively long period.

Advantageously, the insert is in this case made in the form of a strip or endless strip and is moved past the brush device.

Further advantages, features and possible applications of the present invention will become apparent from the description below of preferred embodiments and the attached figures. [[, in which:]]

~~Figure 1 shows a device for storing and/or transporting discrete articles;~~

~~Figure 2 shows three different embodiments of the device from Figure 1, with inserts according to the invention;~~

~~Figure 3 shows an example of a securing procedure for an insert according to the invention; and~~

~~Figures 4 to 8 show different embodiments of the insert according to the invention.~~

For the sake of clarity, Figure 1 shows a device for storing and/or transporting discrete articles. Visible in Figure 1 is a crate 1, which is closed on all sides except that to the left of the visible front side. If appropriate, however, the side opposite the open side could also be open.

Parallel to the lower and upper edges of the open side there extend rods or tubes 2 which are suspended in rod holders 12 which, for their part, are secured to the housing wall of the crate

1. In the vicinity of the closed rear wall, too, corresponding rods 2 each extend in the vicinity of the upper and lower edges.

The rods 2 carry flexible material webs 4 which have a substantially rectangular shape and have in their corner regions respective eyelets 9 which are pushed onto the rods 2. In this arrangement, the spacing between the rods 2 and the spacing between the eyelets 9 on the webs 4 are each dimensioned with respect to one another such that the material webs 4 can hang loosely down from the upper rods 2 or are slightly tensioned so that the material webs 4 form substantially flat, planar material webs. Between the individual material webs 4, there are additionally pushed onto the rods 2 in each case spacers 10 in the form of short tubular portions whereof the external diameter is greater than the internal diameter of the eyelets 9, and the material webs 4 which are thus adjacent are held at a fixedly predeterminable spacing.

Between each two adjacent material webs 4, U-shaped connection webs 5 are sewn in, and together with the vertical material webs 4 these form U-shaped bags. In the example embodiment illustrated in Figure 1, in each case two connection webs 5 are sewn at a spacing one above the other between two respective adjacent separating webs 4, so that two U-shaped bags 3 lying one above the other are formed between each two separating webs 4.

The connection webs 5 also have inserts 6. The inserts may extend in depth over the entire length of the connection web 5, but they may also be only relatively short.

It will be understood that the device may for example also simply comprise horizontal webs.

It is furthermore possible to make the bag in two plies at least in the region which takes up the main load of the discrete article, and to push the insert between the plies.

Figure 2 illustrates two material webs 4 which are arranged parallel to one another and have corresponding eyelets 9. Clearly visible here, too, are three connection webs 3 which form the bags. The letters A, B and C here indicate three different embodiments having different inserts 6. In the case A, the insert merely comprises an insert 6 which is secured to the connection web 3 by a double-sided adhesive tape and/or hook-and-burr closure and which extends over substantially the entire length of the connection web 3. If, during use, damage and/or soiling



of the insert 6 should occur, it can be separated from the connection web 3 and replaced by another, undamaged and unsoiled insert 6.

The embodiment B shows how a plurality of inserts 6 are arranged one above the other on the connection web 3. If, during use, damage and/or soiling of the top insert 6 should occur, it can be removed so that the next insert 6, underneath it, is revealed. Ideally, a check is carried out at regular intervals to ensure that a sufficient number of inserts 6 is still arranged on the connection web 3 and, if this is not the case, the inserts 6 are supplemented accordingly.

The embodiment C, finally, shows an insert 6 which is arranged as a wrapped-around strip. If the upper side of the insert 6 is soiled and/or damaged, the wrapped-around strip can simply be displaced around the connection web 3 so that the lower part of the strip comes to lie on the upper side of the connection web 3.

In addition, as an option, a brush device 7 is also arranged here, and this comes into contact with the strip-shaped insert 6. If the strip-shaped insert 6 is moved relative to the bag or the connection web 3 forming the bag, this automatically results in the surface of the strip-shaped insert 6 being brushed off by the brush device 7. Any particles which are on the surface of the insert are then effectively removed by the brush device 7. In a particularly preferred embodiment, the brush device is connected to electrical ground, with the result that movement of the brush device 7 in relation to the insert 6 creates an anti-static effect, and no dust is attracted to the inserts 6.

It goes without saying that the brush device does not have to be arranged in the position shown in the figure, but may also be arranged in front of, behind, above or below the insert 6.

It will be understood that, similarly to the embodiment B, a plurality of wrapped-around strips may also be arranged one above the other, so that in the event of wear a wrapped-around strip may when necessary be removed.

Figure 3 illustrates the procedure for securing the insert 6 to the bag. As can be seen at the top of Figure 3, first of all the securing sections 8 are bent around downward in appropriate manner (see middle illustration of Figure 3) and then they are placed on the bag, as illustrated by the bottom illustration of Figure 3.

Figure 4 shows a whole series of different inserts according to the invention. For example, the inserts may have a round U-shaped cross-section, a V-shaped cross-section, a flat cross-section or a rectilinear U-shaped cross-section. It goes without saying that the inserts 6 may also accordingly have a different shape, however. Furthermore, it is advantageously possible to reinforce the inserts, for example with the aid of a stiff foil.

Figure 5 illustrates a further, particularly preferred embodiment of the invention. Here, the insert 6 is not connected to the bag but – similarly to the embodiment C in Figure 2 – the insert 6 is in the form of a wrapped-around strip and itself forms the base of the bag. To secure the insert 6, two rods 13 are provided, around which the strip-shaped insert 6 runs. Instead of the rods 13, cables or ropes could for example also be used. In the embodiment shown, the rods 13 run through eyelets in the vertical material webs 4. However, it will be understood that the rods 16 may also run outside the vertical material webs 4. The insert 6 may where necessary be displaced simply by the two rods 13.

It goes without saying that this type of securing may also be combined with the embodiment C in Figure 2, as illustrated in Figure 6. In Figure 6, the strip-shaped insert 6 surrounds both the horizontal connection web 3 and the two rods 13. This embodiment has the advantage over the embodiment C shown in Figure 2 that the strip-shaped insert can be moved more easily.

Figures 7 and 8 illustrate different views of a further embodiment of the invention. The insert 6 is constructed as a wrapped-around strip in this case too. However, in this case the strip has a substantially U-shaped cross-section, so that the insert is also arranged against the lateral material webs 4 and so provides a certain amount of protection for these webs as well.